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29 MAY 1968

MEMORANDUM FOR: Deputy Director of Intelligence  
THROUGH : DDI Planning Officer  
SUBJECT : Request for Approval of ADP Project

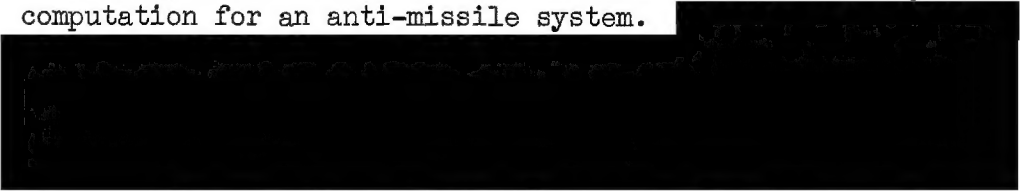
1. Problem

The Defensive Missiles Branch, OSR is attempting to predict the deployment of Soviet air and missile defense systems based upon the identification of past Soviet deployment criteria. The methodology underlying deployment prediction is somewhat different for short-range than for long-range systems. In the case of a short-range ABM system of the terminal intercept type, the deployment criteria must be sufficiently refined that the analyst can choose between deployment at a civilian target and a military target, or between civilian targets of differing composition. This entails ranking and weighting the measures of merit by which the importance of each target is judged. This task is difficult because the proximity of targets to each other obscures the real purpose of the deployment. In the case of long-range systems this problem is alleviated as targets of different kinds are aggregated into large defended areas. In these latter circumstances the defended areas can be outlined and ranked on the basis of past air defense deployment even if the reasons for the past activity are not well understood. Similar problems exist for the deployment of air defense systems.

Given a deployment projection we wish to aggregate the measures of value such as population, and various industrial capacities which are protected by the deployed system. To do this the area covered by the system must be plotted.

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Relatively simple for air defense systems, this is a major computation for an anti-missile system.



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Finally, the results of an estimated deployment program can be tested under various assumed scenarios in the OSR strategic exchange model. By varying the assumptions, different program parameters can be examined and obvious weaknesses or strengths highlighted for subsequent analysis.

## 2. Current Method

In pursuing these problems several analytical tools are proving valuable. The Axmaster, the OSR computer system by which various indices of value can be measured within defended areas, is being used extensively in our investigation of deployment criteria. The nature of the Axmaster, the use of circles and grids to describe defended areas, limits its utility primarily to the short-range ABM system and air defense problem. It is not adequate to define or measure the large, irregular defended areas which we wish to use for predicting the deployment of long-range ABM systems. These latter areas are plotted by the Automap System of OBGI and measured on available equipment. Dividing the number of SAM sites by the square nautical miles of the area we obtain an index of defense density by which these areas can be ranked. Deriving the area would be very difficult without the Automap System.

For a long-range ABM system, the footprint must be plotted in order to aggregate properly the measures of value protected. Because of the difficult and lengthy computations required to compute the many footprints of each alternative program, this step of the analysis cannot now be done.

To utilize the results of an estimated program in the OSR strategic exchange model, measures of value must be assigned to Soviet point targets. Today these points are evaluated in terms of US fatalities inflicted if they survive.

Similarly, US targets are evaluated in Soviet fatalities. Missile and air defenses are also allocated to designated points on the basis of an assumed circle of coverage. We hope to extend the measures of damage assessment beyond fatalities inflicted if suitable indices can be developed from the research on defense deployment criteria. The allocation of the missile defenses can also be made more realistic by plotting the actual footprint.

### 3. Description of Proposed Application

Neither the Axmaster nor the Automap Systems need be reprogrammed under this proposal although some information which would permit the accurate computation of total population defended would be added to their data bases. This population data compensates for rural background population which is currently unavailable on existing programs. Rural and suburban population substantially augments the urban (currently available) population when large defended areas are considered. These data have been compiled at our request by the USSR Branch, Geography Division, OBGI and now await programming in OCS. They will be reviewed by OBGI for updating annually.

Secondly, we wish to have the Agency acquire the "Missile Footprint Computer Program" used by the Sentinel System Office for the US Sentinel Anti-Ballistic Missile Program. Preliminary inquiries have been made of Mr. Sisco of the Sentinel System Office and with computer personnel at the White Sands Missile Test Range (SENSEA) where the program is used. No difficulties are foreseen in acquiring the program although some adjustments may be required to run it on Agency equipment.

### 4. Advantages of Proposed Application

These proposals will allow us to assess more realistically the implications of alternative air and missile defense programs projections and to extend the OSR strategic exchange model capabilities.

5. Estimated Resources

Office of Basic and Geographic Intelligence

USSR Branch, Geographic Division: annual  
updating of Soviet population data base 80 hrs.

Technical Support Branch, Cartographic Division

-- Plotting on the Automap System 25 hrs. per run  
-- Digitizing and compiling for plot  
measurement 40 hrs. per run

Office of Computer Services

Development time for the population data  
base program 30-60 hrs.

Computer time  $\frac{1}{2}$  hr. per run

ABM Missile Footprint Program 160 hrs.  
Adoption to Agency Equipment

Office of Strategic Research: Currently two man years are  
being devoted to these tasks; this will continue but with  
greater effectiveness.

6. Degree of Urgency

Portions of the research on Soviet deployment  
criteria have been completed. By July OSR must complete a  
contribution to NIE 11-3-68, Soviet Capabilities for Strategic  
Air and Missile Defense. In the preparation of this contri-  
bution the population data program would be useful. The  
acquisition of the "Missile Footprint Computer Program" will  
probably require several months. We wish to use it for  
research beginning in the fall and we are proceeding to  
request the program from the Sentinel System Manager, Lt.  
Gen. Alfred D. Starbird.

7. ADP Plan

This application complements and augments the Axmaster  
project which is included in the five year ADP plan.

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8. Outlook

The OCS programming will be done only once. The utilization of the programs, particularly the Automap and the population aggregation program will occur in two stages. While we attempt to define the criteria underlying past deployment programs we anticipate a high use rate, perhaps six or more iterations over the next year. Thereafter we anticipate preparing program projections only once or twice a year. The Axmaster and the OSR strategic exchange model will continue to be used extensively for many purposes beyond those mentioned here.

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Strategic Research

APPROVED:

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Deputy Director for Intelligence

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